

Subt I

✓ 1. (Amended Six Times) A semiconductor device,
comprising:

a substrate defining a datum surface, wherein the
substrate is a first conductive type substrate;

5 an epitaxial layer formed on the substrate above the
datum surface;

a first embedded diffusion layer formed as part of a
first vertical type bipolar transistor in a first upper part
of the substrate and in the epitaxial layer;

H 10 a second embedded diffusion layer formed as part of a
second vertical type bipolar transistor directly on the
substrate, in a second upper part of the substrate, and within
a lower part of the epitaxial layer,

15 wherein the second embedded diffusion layer is a second
conductive type second embedded diffusion layer that is a
different conductive type from the first conductive type
substrate and includes an impurity concentration that is less
than the impurity concentration of the first embedded
diffusion layer, and

20 wherein a peak position of an impurity concentration of
the first embedded diffusion layer resides at a first distance
from the datum surface of the substrate and a peak position of
an impurity concentration of the second embedded diffusion
layer resides at a second distance from the datum surface of
25 the substrate such that the first distance is greater than the
second distance.

3. (Amended Three Times) A semiconductor device according
to claim 1,

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wherein a bottom of the first embedded diffusion layer is
formed at a third distance from the datum surface of the
5 substrate, and

wherein a midpoint of the second embedded diffusion layer
is formed at a fourth distance from the datum surface of the
substrate such that the fourth distance is greater than the
third distance.

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4. (Amended Three Times) A semiconductor device according
to claim 1, wherein the impurity concentration of the second
embedded diffusion layer includes a first impurity
concentration that is equal to and includes a second impurity
15 concentration that is greater than the impurity concentration
of that portion of the epitaxial layer formed above the second
embedded diffusion layer.

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20. (Amended Two Times) A semiconductor device according
20 to claim 1, further comprising:

a first base disposed between two first graft base layers
and disposed above the first embedded diffusion layer on the
epitaxial layer to define a first epitaxial thickness; and

a second base disposed between two second graft base
25 layers and disposed above the second embedded diffusion layer
on the epitaxial layer to define a second epitaxial thickness,

wherein the first epitaxial thickness is less than the
second epitaxial thickness.

H⁴ SUB 17
21. (Amended One Time) A semiconductor device according to claim 1, wherein the impurity concentration of the second embedded diffusion layer is approximately equal to or higher than the epitaxial impurity concentration at all distances greater than the second distance.

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23. (Amended One Time) A semiconductor device according to claim 1, wherein the first vertical type bipolar transistor defines a voltage that is different than a voltage of the a second vertical type bipolar transistor,
wherein the substrate is a silicon substrate,
wherein the first embedded diffusion layer includes an impurity concentration that is higher than the epitaxial impurity concentration, and
15 wherein the second embedded diffusion layer defines a conductive type that is the same as the epitaxial conductive type.

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24. (New) A semiconductor device according to claim 1, wherein the second vertical type bipolar transistor includes a base layer disposed between two graph layers and wherein the epitaxial layer is disposed between the base layer and the second embedded diffusion layer.

25. (New) The semiconductor device of claim 1, wherein the substrate is a P-type substrate and wherein the second embedded diffusion layer is an N⁺-type second embedded diffusion layer.

26. (New) The semiconductor device of claim 1, wherein the substrate is a N-type substrate and wherein the second embedded diffusion layer is an P-type second embedded diffusion layer.
